

mechanism, the first short and long links of the first joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the first short link of the first joint cross linkage of the link retaining mechanism and the first end portion of the first long link of the first joint cross linkage of the link retaining mechanism, a second short link having first and second end portions and substantially equal in length to the first short link of the first joint cross linkage of the link retaining mechanism, the first long link of the first joint cross linkage of the link retaining mechanism and the second short link of the first joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the first long link of the first joint cross linkage of the link retaining mechanism and the first end portion of the second short link of the first joint cross linkage of the link retaining mechanism, and a second long link having first and second end portions and substantially equal in length to the first long link of the first joint cross linkage of the link retaining mechanism, the second short and long links of the first joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the second short link of the first joint cross linkage of the link retaining mechanism and the first end portion of the second long link of the first joint cross linkage of the link retaining mechanism, the second long link of the first joint cross linkage of the link retaining mechanism and the first short link of the first joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the second long link of the first joint cross linkage of the link retaining mechanism and the first end portion of the first short link of the first joint cross linkage of the link retaining mechanism under the state that the second long link of the first joint cross linkage of the link retaining mechanism is crossed with the first long link of the first joint cross linkage of the link retaining mechanism, and a second joint cross linkage including a first short link having first and second end portions, a first long link having first and second end portions and longer than the first short link of the second joint cross linkage of the link retaining mechanism, the first short and long links of the second joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the first short link of the second joint cross linkage of the link retaining mechanism and the first end portion of the first long link of the second joint cross linkage of the link retaining mechanism, a second short link having first and second end portions and substantially equal in length to the first short link of the second joint cross linkage of the link retaining mechanism, the first long link of the second joint cross linkage of the link retaining

mechanism and the second short link of the second joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the first long link of the second joint cross linkage of the link retaining mechanism and the first end portion of the second short link of the second joint cross linkage of the link retaining mechanism, and a second long link having first and second end portions and substantially equal in length to the first long link of the second joint cross linkage of the link retaining mechanism, the second short and long links of the second joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the second short link of the second joint cross linkage of the link retaining mechanism and the first end portion of the second long link of the second joint cross linkage of the link retaining mechanism, the second long link of the second joint cross linkage of the link retaining mechanism and the first short link of the second joint cross linkage of the link retaining mechanism pivotably connected with each other at the second end portion of the second long link of the second joint cross linkage of the link retaining mechanism and the first end portion of the first short link of the second joint cross linkage of the link retaining mechanism under the state that the second long link of the second joint cross linkage of the link retaining mechanism is crossed with the first long link of the second joint cross linkage of the link retaining mechanism, the length ratio of each of the first and second short links of the first joint cross linkage of the link retaining mechanism to each of the first and second long links of the first joint cross linkage of the link retaining mechanism substantially equal to the length ratio of each of the first and second short links of the second joint cross linkage of the link retaining mechanism to each of the first and second long links of the second joint cross linkage of the link retaining mechanism, the first short link of the first joint cross linkage of the link retaining mechanism integrally formed with and in parallel relationship with the first long link of the second joint cross linkage of the link retaining mechanism under the state that the second end portion of the first short link of the first joint cross linkage of the link retaining mechanism is connected with the first end portion of the first long link of the second joint cross linkage of the link retaining mechanism, the first long link of the first joint cross linkage of the link retaining mechanism integrally formed with and in parallel relationship with the first short link of the second joint cross linkage of the link retaining mechanism under the state that the first end portion of the first long link of the first joint cross linkage of the link retaining mechanism is connected with the second end portion of the first short link of the second joint cross linkage of

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the link retaining mechanism, the first end portion of any one of the first and second arm links integrally formed with the second short link of the first joint cross linkage of the link retaining mechanism, the first end portion of the other one of the first and second arm links integrally formed with the second long link of the second joint cross linkage of the link retaining mechanism; and a robot arm driving mechanism for driving the robot arm.

B2  
[ Page 4, after line 31, insert the following paragraph:

Figure 2a and Figure 2b are schematic illustrations used to explain the operation of the robot arm mechanism of Figure 2.

[ Please amend the paragraph beginning at page 7, line 2, to read as follows:

B3  
The link retaining mechanism 200 pivotably retains the first and second arm links 811 and 812 respectively at the first end portions of the first and second arm links 811 and 812 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the first arm link 811 and the second line being a line symmetrical with respect to the center line 201 with the line passing through the first and second end portions of the second arm link 812. In fact the first and second arm links 811 and 812 are in symmetrical relationship with each other with respect to the center line 201. The above-described parallel relationship is illustrated in Figures 2a and 2b. Figure 2a illustrates the specific relationship shown in Figure 2 wherein the first line L1 passing through the first and second end portions of the link 811 is maintained colinear with the line L2, which is symmetrical with respect to the center line 201 with the line passing through the first and second end portions of the second arm link 812. Figure 2b illustrates the parallel relationship wherein the first line L1 passing through the first and second end portions of the link 811 is maintained parallel, but not colinear, with the second line L2 which is symmetrical with respect to the center line 201 with the line passing through the first and second end portions of the second arm link 812.

[ Please amend the paragraph beginning at page 12, line 26 to read as follows:

B4  
The link retaining mechanism 200 pivotably retains the first and second arm links 821 and 822 respectively at the first end portions of the first and second arm links 821 and 822 and keeps parallel a first line and a second line, the first line being a line passing through the first and

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second end portions of the first arm link 821 and the second line being a line symmetrical with respect to the center line 201 with the line passing through the first and second end portions of the second arm link 822. The first end portion of the first arm link 821 is integrally formed with the second short link 213. The first end portion of the second arm link 822 is integrally formed with the second long link 224. The first end portions of the first and second arm links 821 and 822 are positioned on the center line 201. In fact the first and second arm links 821 and 822 are in symmetrical relationship with each other with respect to the center line 201.

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Please amend the paragraph beginning at page 15, line 25 to read as follows:

B5

The link retaining mechanism 300 pivotably retains the first and second arm links 831 and 832 respectively at the first end portions of the first and second arm links 831 and 832 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the first arm link 831 and the second line a line symmetrical with respect to the center line 301 with the line passing through the first and second end portions of the second arm link 832.

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Please amend the paragraph beginning at page 20, line 7 to read as follows:

B6

The link retaining mechanism 350 pivotably retains the first and second arm links 851 and 852 respectively at the first end portions of the first and second arm links 851 and 852 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the first arm link 851 and the second line being a line symmetrical with respect to the center line 351 with the line passing through the first and second end portions of the second arm link 852.

[

Please amend the paragraph beginning at page 23, line 17 to read as follows:

B7

The robot arm 880 further comprises a fifth arm link 885 having first and second end portion, a sixth arm link 886 having first and second end portion, and an additional link retaining mechanism 250 having an additional center line 251. The additional link retaining mechanism 250 pivotably retains the fifth and sixth arm links 885 and 886 respectively at the first end portions of the fifth and sixth arm links 885 and 886 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the fifth arm

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link 885 and the second line being a line symmetrical with respect to the additional center line 251 with the line passing through the first and second end portions of the sixth arm link 886. In fact the fifth and sixth arm links 885 and 886 are in symmetrical relationship with each other with respect to the center line 251.

Please amend the paragraph beginning at page 26, line 11 to read as follows:

B8

The link retaining mechanism 400 pivotably retains the first and second arm links 891 and 892 respectively at the first end portions of the first and second arm links 891 and 892 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the first arm link 891 and the second line being a line symmetrical with respect to the center line 401 with the line passing through the first and second end portions of the second arm link 892. In fact the first and second arm links 891 and 892 are in symmetrical relationship with each other with respect to the center line 401.

Please amend the paragraph beginning at page 29, line 28 to read as follows:

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The link retaining mechanism 500 pivotably retains the first and second arm links 901 and 902 respectively at the first end portions of the first and second arm links 901 and 902 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the first arm link 901 and the second line being a line symmetrical with respect to the center line 501 with the line passing through the first and second end portions of the second arm link 902. In fact the first and second arm links 901 and 902 are in symmetrical relationship with each other with respect to the center line 501.

Please amend the paragraph beginning at page 35, line 37 to read as follows:

B10

The robot arm 930 further comprises an additional link retaining mechanism 450 having an additional center line 451. The additional link retaining mechanism 450 pivotably retainins the fifth and sixth arm links 935 and 936 respectively at the first end portions of the fifth and sixth arm links 935 and 936 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the fifth arm link 935 and the second line being a line symmetrical with respect to the additional center line 451 with the line passing through the first and second end portions of the sixth arm link 936. In fact the fifth and sixth arm

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links 935 and 936 are in symmetrical relationship with each other with respect to the additional center line 451.

Please amend the paragraph beginning at page 38, line 28 to read as follows:

B11

The robot arm 940 further comprises an additional link retaining mechanism 450 having an additional center line 451. The additional link retaining mechanism 450 pivotably retains the fifth and sixth arm links 945 and 946 respectively at the first end portions of the fifth and sixth arm links 945 and 946 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the fifth arm link 945 and the second line being a line symmetrical with respect to the additional center line 451 with the line passing through the first and second end portions of the sixth arm link 946. In fact the fifth and sixth arm links 945 and 946 are in symmetrical relationship with each other with respect to the additional center line 451.

Please amend the paragraph beginning at page 40, line 18 to read as follows:

B12

The robot arm 950 further comprises a fifth arm link 955 having first and second end portion and a sixth arm link 956 having first and second end portion. The robot arm 950 further comprises an additional link retaining mechanism 450 having an additional center line 451. The additional link retaining mechanism 450 pivotably retains the third and fourth arm links 953 and 954 respectively at the first end portions of the third and fourth arm links 953 and 954 and keeps parallel a first line and a second line, the first line being a line passing through the first and second end portions of the third arm link 953 and the second line being a line symmetrical with respect to the additional center line 451 with the line passing through the first and second end portions of the fourth arm link 954. In fact the third and fourth arm links 953 and 954 are in symmetrical relationship with each other with respect to the additional link retaining mechanism 450.

In the Claims:

Amend claims 1, 8, 22, 25, and 28 to read as follows:

B13

1. (Twice Amended) A robot arm mechanism comprising:  
a handling member for supporting and handling an object;